

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently Amended): A two-dimensional photonic crystal, wherein on a plane in which four adjoining unit lattices are arranged so as to have one angle in common with the unit lattice being a rectangle whose shorter side X1 has a length of x1 and whose longer side Y1 has a length of y1, first dielectric regions each being columnar and having a rectangular cross section whose shorter side X2 has a length of x2 and whose longer side Y2 has a length of y2 are disposed on said shorter sides X1 and said longer sides Y1 of each rectangular unit lattice,

characterized in that said first dielectric region is arranged so that the midpoint of said shorter side X1 and the midpoint of said longer side Y1 and the center of said rectangular cross section substantially coincide,

said longer sides Y2 of each said first dielectric region are substantially parallel to each other,

the ratio of x1:y1 equals 1:substantially  $\sqrt{3}$ , and

the ratio of x1:x2:y2 equals 1:0.133:0.48 to 1:0.158:0.58; and wherein:

said two dimensional-photonic crystal has a full band gap width of 22.5% or greater.

2. (Currently Amended): The two-dimensional photonic crystal according to claim 1 or 18, characterized in that said first dielectric region is arranged so that said longer side Y2 of the rectangular cross section is substantially parallel to said longer side Y1 of the unit lattice.

3. (Currently Amended): The two-dimensional photonic crystal according to claim 1 or 2 18, characterized in that the ratio of  $x_1:x_2:y_2$  equals 1:0.135:0.48 to 1:0.150:0.54.

4. (Currently Amended): The two-dimensional photonic crystal according to claim 1 or 2 18, characterized in that the ratio of  $x_1:x_2:y_2$  equals 1:0.135:0.52 to 1:0.140:0.54.

5. (Currently Amended): The two-dimensional photonic crystal according to claim 1 or 2 18, characterized in that the size of said rectangular cross section is  $0.10\text{ }\mu\text{m}$ -times- $\times$   $0.37\text{ }\mu\text{m}$ , or greater.

6. (Original): The two-dimensional photonic crystal according to claim 1, characterized in that said photonic crystal comprises a second dielectric region surrounding said first dielectric region and having a dielectric constant different from that of said first dielectric region, one of said first dielectric region and said second dielectric region is formed from a dielectric material, and the other is formed from a gas.

7. (Original): The two-dimensional photonic crystal according to claim 6, characterized in that said dielectric material is a BaO-TiO<sub>2</sub> based dielectric material or BaO-Nd<sub>2</sub>O<sub>3</sub>-TiO<sub>2</sub> based dielectric material.

8. (Currently Amended): The two-dimensional photonic crystal according to claim 6 or 18, characterized by comprising a flat-plate shaped base, and a plurality of said first dielectric regions formed from a dielectric material the same as that of said base and erected from said base.

9. (Currently Amended): The two-dimensional photonic crystal according to claim 1 or 18, characterized in that said photonic crystal comprises a second dielectric region surrounding said first dielectric region and having a dielectric constant different from that of said first dielectric region, and said first dielectric region and said second

dielectric region are formed from dielectric materials having different dielectric constants.

10. (Original): The two-dimensional photonic crystal according to claim 9, characterized in that said first dielectric region and said second dielectric region are fired bodies.

11. (Original): The two-dimensional photonic crystal according to claim 9, characterized by comprising a flat-plate shaped base, a plurality of said first dielectric regions erected from said base and formed from a dielectric material the same as that of said base, and a second dielectric region surrounding said first dielectric region.

12. (Currently Amended): A two-dimensional photonic crystal in which first dielectric regions and second dielectric regions having a dielectric constant different from that of said first dielectric region are periodically disposed,

characterized in that the two-dimensional photonic crystal comprises:  
said first dielectric regions each being columnar and having a rectangular cross section; and

said second dielectric regions each surrounding said first dielectric region,  
a line segment L<sub>x</sub> linking centers of two of said first dielectric regions adjoining in an X direction and a line segment L<sub>y</sub> linking centers of two of said first dielectric regions adjoining in a Y direction orthogonal to said X direction are substantially orthogonal to each other substantially at their midpoints,

the ratio between the length x<sub>3</sub> of said line segment L<sub>x</sub> and the length y<sub>3</sub> of said line segment L<sub>y</sub> equals 1:substantially  $\sqrt{3}$ , and the ratio between the length x<sub>3</sub> of said line segment L<sub>x</sub> and the length x<sub>2</sub> of said first dielectric region in said X direction and the length y<sub>2</sub> in said Y direction equals 1:0.133:0.48 to 1:0.158:0.58; and wherein:

said two dimensional-photonic crystal has a full band gap width of 22.5% or greater.

13. (Currently Amended): The two-dimensional photonic crystal according to claim 12 or 19, characterized in that the ratio of  $x_3:x_2:y_2$  equals 1:0.135:0.48 to 1:0.150:0.54.

14. (Currently Amended): The two-dimensional photonic crystal according to claim 12 or 19, characterized in that the ratio of  $x_3:x_2:y_2$  equals 1:0.135:0.52 to 1:0.140:0.54.

15. (Original): The two-dimensional photonic crystal according to claim 12, characterized in that one of said first dielectric region and said second dielectric region is formed from a dielectric material, and the other is formed from a gas.

16. (Currently Amended): The two-dimensional photonic crystal according to claim 12 or 19, characterized in that said first dielectric region and said second dielectric region are formed from dielectric materials having different dielectric constants.

17. (Currently amended): The two-dimensional photonic crystal according to claim 4 18 or 42 19, characterized in that said two dimensional-photonic crystal has a full band gap width of 22.5 ~~20.0~~% or greater.

18. (Previously presented): A two-dimensional photonic crystal, wherein on a plane in which four adjoining unit lattices are arranged so as to have one angle in common with the unit lattice being a rectangle whose shorter side  $X_1$  has a length of  $x_1$  and whose longer side  $Y_1$  has a length of  $y_1$ , first dielectric regions each being columnar and having a rectangular cross section whose shorter side  $X_2$  has a length of  $x_2$  and whose longer side  $Y_2$  has a length of  $y_2$  are disposed on said shorter sides  $X_1$  and said longer sides  $Y_1$  of each rectangular unit lattice,

characterized in that said first dielectric region is arranged so that the midpoint of said shorter side  $X_1$  and the midpoint of said longer side  $Y_1$  and the center of said rectangular cross section substantially coincide,

said longer sides Y2 of each said first dielectric region are substantially parallel to each other,

the ratio of  $x_1:y_1$  equals 1:substantially  $\sqrt{3}$ , and

the ratio of  $x_1:x_2:y_2$  equals 1:0.133:0.48 to 1:0.158:0.58; wherein:

said photonic crystal comprises a second dielectric region surrounding said first dielectric region and having a dielectric constant different from that of said first dielectric region, one of said first dielectric region and said second dielectric region is formed from a dielectric material, and the other is formed from a gas, and;

said dielectric material is a BaO-TiO<sub>2</sub> based dielectric material or BaO-Nd<sub>2</sub>O<sub>3</sub>-TiO<sub>2</sub> based dielectric material.

19. (Previously presented): A two-dimensional photonic crystal in which first dielectric regions and second dielectric regions having a dielectric constant different from that of said first dielectric region are periodically disposed,

characterized in that the two-dimensional photonic crystal comprises:

said first dielectric regions each being columnar and having a rectangular cross section; and

said second dielectric regions each surrounding said first dielectric region,

a line segment L<sub>x</sub> linking centers of two of said first dielectric regions adjoining in an X direction and a line segment L<sub>y</sub> linking centers of two of said first dielectric regions adjoining in a Y direction orthogonal to said X direction are substantially orthogonal to each other substantially at their midpoints,

the ratio between the length  $x_3$  of said line segment L<sub>x</sub> and the length  $y_3$  of said line segment L<sub>y</sub> equals 1:substantially  $\sqrt{3}$ , and the ratio between the length  $x_3$  of said line segment L<sub>x</sub> and the length  $x_2$  of said first dielectric region in said X direction and the length  $y_2$  in said Y direction equals 1:0.133:0.48 to 1:0.158:0.58; and wherein:

one of said first dielectric region and said second dielectric region is formed from a dielectric material, and the other is formed from a gas, and;

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said dielectric material is a BaO-TiO<sub>2</sub> based dielectric material or BaO-Nd<sub>2</sub>O<sub>3</sub>-TiO<sub>2</sub> based dielectric material.